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IMPACT OF AQUA DRUGS ON HEALTH OF FARM FISHES OF PUTHIA UPAZILA, RAJSHAHI

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ABSTRACT

Ahmed GU, Shams S, Yeasmin T, Zaman MFU (2017) Impact of aqua drugs on health of farm fishes of Puthia Upazila, Rajshahi. *Int. J. Expt. Agric.* 7(1), 22-28.

The present study was carried out for a period of nine months from September 2015 to May 2016. Twenty five fish farms of Puthia upazila under Rajshahi district were selected to observe the present status of use of commercial aqua drugs and their impact on fish health. Data were collected through questionnaire interview with fish farmers, drug sellers, personal contact and market survey. Eight categories of aqua drugs were observed as pond preparation, water quality management, disinfectant, disease treatment, antibiotics, growth promoter, insect killer and improvement of dissolve oxygen level. In the investigated area various types of diseases such as EUS (epizotic ulcerative syndrom), red spots and ulcers in rohu (*Labeo rohita*), catla (*Gibelion catla*) and mrigal (*Cirrhinus cirrhosus*), kalibaush (*Labeo calbasu*) and silver carp (*Hypophthalmicthys molitrix*), tail and fin rot in silver berb (*Puntius sarana*), lernaesis and exophthalmia in catla were observed. Farmers used various aqua drugs and chemicals such as Pond care, Zeopel, Novazeolite, Yuka, Acimec-1%, GPC-8, KZ fish vita, Renamycin, Timsen, Aquamysine, Deletix, Bio-ox, Oxy-gold, Oxymore, Eska-CTC, Renaflox, Renamox, Aqua-boost, Sumithione and Virex as trade names for disease and health problems of their cultured fishes. The results revealed that aqua drugs had a definite impact on the recovery of fish diseases (60 to 90%) in various culture fishes of the study area. Clinically fishes were found to be normal in the month of October, whereas, whitish deep ulcer was found in the month of January. Histologically, skin-muscle, gill, liver and kidney of the investigated fishes were found almost normal structure during October, whereas, there were some pathological changes like necrosis, vacuums, hemorrhage, pyknosis, hypertrophy and lamellar missing in December and January. From the present study, it could be stated that, aqua drugs had positive impact on aquaculture production except some pathological changes in the investigated organs of farm fishes especially during winter months.

Key words: *aqua drugs, fish health, diseases*

INTRODUCTION

Bangladesh has achieved remarkable progress in the fisheries sector since its independence in 1971 and this sector have been playing a very significant role in food security and deserve potential for future development in the agrarian economy of Bangladesh (DoF 2016). The sector's contribution to the national economy is much higher than its 4.65% share in GDP (DoF 2016). With the increase and intensification of aquaculture in Bangladesh, the use of drugs and chemicals has tremendously increased. In aquaculture, drugs and chemicals are used for pond preparation, oxygen balancer, gas reducer, insect killer, disinfectants, antibiotics and growth promoter. Farmers commonly used aquaculture drugs in Bangladesh including Zeolite, Zeolite plus, Acme's zeolite, Geotox, Aqua boost, Aquamin, Megavit aqua, Cevit vet, Aqua savor, Timsen, Emsen, Rotenone, Bleaching powder, Oxytetracycline, Renamycine, Renamox, Bactitab, Eco-solution, Potassium permanganate, Cotrim vet and Tetra vet for the treatment of diseased fish and shellfish (Ahmed *et al*. 2014a). GR plus, Active blue with copper sulphate, ID plus, OTC power, Aqua C vit, H. vit plus were used for the treatment of EUS in pangus, stinging catfish and Thai climbing perch having an average recovery of 80-90%. For the treatment of Edwardsiellosis in pangus and Thai climbing perch, farmers used GR plus, ID plus, OTC power, Aqua C vit, H. vit plus and Potassium permanganate which had an average recovery of 75-80%, and for the treatment of dropsy in Thai climbing perch and stinging catfish, GR plus, ID plus, OTC power, Aqua C vit, H.vit plus and Potassium permanganate were used which had an average recovery of 75-85% (Ahmed *et al*. 2015b). It has been realized that farmers used these aqua-medicines without knowing their efficacy. This creates major problem in aquatic environment and causes for low production in aquaculture. Thus, the present study was conducted to investigate aqua drugs and chemicals of Puthia upazila and their impacts on fish health through clinical, histological and overall field observations.

MATERIALS AND METHODS

The present study was carried out for 9 months from September 2015 to May 2016 in Rajbari and Biraldoho union of Puthia upazilla under Rajshahi district. Data was collected from different target groups such as fish farmers and Aqua drug sellers. Data were collected through questionnaire interview, personal contact with fish farmers and market survey with retailers of drug shops. Two species of fish, catla (*Gibelion catla*) and mrigal (*Cirrhinus cirrhosus*) were collected as samples through selected farmers by using cast net. A Total of 40 catla and mrigal were collected to investigate health status of fish.

The samples were collected from the field level for health check through histological observation. Fish samples were collected from skin-muscle, gill, liver and kidney. Sampling was done by a sharp scalpel and forceps and fixed in 10% neutral buffer formalin and kept in transparent plastic vials. Fish samples were processed in an automatic tissue processor (SHANDON, CITADEL 1000), embedded, sectioned using a microtome (Lecia JUNG RM 2035), stained with haematoxyline and eosin, mounted with Canada balsam and the slides were

examined under a compound microscope (OLYMPUS, Model CHS, Japan). Then photomicrographs were taken by a photographic camera in Fish Disease Laboratory at BAU, Mymensingh.

RESULTS AND DISCUSSION

During the present investigation 25 fish farms were investigated in Puthia upazila. Eight categories of aqua-drugs and chemicals were recorded from the aqua drugs shops which were used by the farmers. The categories were pond preparation and water quality maintenance, oxygen suppliers, gas removal, growth promoters, disinfectants, antibiotics and insect killer. Ahmed *et al.* (2015a) mentioned five categories and 28 pharmaceutical companies in the Sherpur region. Ahmed *et al.* (2014b) also observed that ten different categories of chemicals were found to be used in aquaculture activities such as antibiotics, disinfectants, gas removal, oxygen suppliers, vitamins and minerals, growth promoter, insect killer and pH balance. In present experiment, forty products of animal health companies were recorded from markets and field level which were widely used by farmers for the treatment of fish diseases such as Pond care, Zeopel, Novazeolite, Yuka, Acimec-1%, GPC-8, KZ fish vita, Renamycin, Timsen, Aquamysine, Deletix, Bio-ox, Oxy gold, Oxymore, Eska-CTC, Renaflox, Renamox, Aqua-boost, Sumithione and Virex. Ahmed *et al.* (2015b) found that 55 different types of aqua-drugs and chemicals were recorded. Among those, 20 types were widely used by the farmers for different disease treatment of fish such as bactitab, chlorsteclin, orgacycline, orgamycine-15%, oxy-d vet, oxysentin, renamox, renamycin, malachite green, methylene blue, bleaching powder, potassium permanganate, eco-solution, basudin, timsen, oxytetracycline, lime, formalin, oxolinic acid and sarafloxacin.

Impact on fish health and disease

In the present research, different types of fish diseases like EUS, tail and fin rot, red spots, ulcer on fins, white spot, exophthalmia and parasitic disease, mostly argulosis in rohu, catla, mrigal, silver carp, tilapia and silver berb were observed (Table 1). Faruk *et al.* (2004) and Rahman (2011) also observed that disease conditions in aquaculture of Bangladesh were EUS, red spot, dropsy, tail rot and fin rot in different fish species such as stinging catfish, Thai climbing perch, tilapia and Thai pangus. In the present study farmers used Timsen, Potash and Salt for EUS in rohu, catla and mrigal which had shown 80% recovery. According to Rahman (2012) in case of EUS, farmers of Jamalpur used Oxysentin 20%, Aquamycine and Acimox powder and achieved 90% recovery in tilapia, rohu, catla and pangus. According to Ahmed *et al.* (2014b) to treat EUS affected tilapia farmers of Fulpur upazilla used Renamycin, Polgard plus and Ossi C with a result of 80-95% recovery. Ahmed *et al*. (2015b) observed that GR plus, Active blue with Copper sulphate, ID plus, OTC power, Aqua C vit, H. vit plus were used for the treatment of EUS in pangus, stinging catfish and Thai climbing perch having an average recovery of 80-90%. To treat EUS affected tilapia in Fulpur and Muktagacha farmers used Renamycin, Polgard plus, and Ossi-C with a result of 80 to 95% (Ahmed *et al*. 2015b). For the treatment of tail and fin rot in mirror carp and silver berb farmers used Renaflox which had shown 60% recovery. Majumder (2016) observed that tail and and fin rot affected rui, catla and silver carp had a recovery of 75% when treated with Aquamycine and Bactitab at a dose of 50g per kg body weight. When ponds were treated with KM_nO_4 (4 ppm) for lernaesis, 80% recovery was achieved. Farmers used Esca-ctc, Renaflox and Rena-C for red spots and ulcers on fins in rohu, catla, and silver carp which had shown 85% recovery, whereas, 70% recovery was achieved in case of tilapia having same treatment. According to Majumder (2016) red spots in pangus had 65% recovery by treating with oxy-D Vet, Ascamycine. When treated with Oxytetracycline and Potash for exophthalmia, 60-70% recovery was recorded in the study areas.

Table 1. Impact of aqua drugs on fish health and disease recovery in the study area at Puthia upazila through interview with drug sellers

Area	Species	Disease Prevalence (%)	Clinical Sign	Aqua drugs and doses	Active ingredients	Recovery (%)
Puthia	Rohu, Catlaand Mrigal	EUS (40%)	Red spot on body surface, Lesion on body surface	Timsen 80g/33dec Potash (1.6 g/acre) Salt (10-20kg/33 dec)	n-alkyl dimethyl benzyl ammonium chloride-40%, stabilized urea-60%	80%
	Minor carp, Silver berb	Tail and fin rot (30%)	Milky white areas on fins or tails	Renaflox (100g/10-20 kg) feed for 5-7 days	Oxytetracycline-20%	60%
	Catla and Mrigal	Lernaesis (30%)	Fishes were restless and rubbed body against the side and bottom of the pond	$KMnO_4$ pond treatment at 4 ppm	$KMnO_4$	80%
	Rohu, Catla, and silver carp	Red spots and ulcer on fins (60%)	Red spots on at base of fins and gradually turned to a ulcer	Eska CTC (10g/kg feed) Renaflox (3-5g/kg feed) Rena-C (4g/kg feed)	Chlorotetracycline-25% Ascorbic acid	85%
	Tilapia	Red spot and ulcer on fins (30%)	Red spots on at base of fins and gradually turned to a ulcer	Eska CTC (4-5 g/kg feed) Renaflox (3-5g/kg feed) Rena-C (4g/kg feed) Lime and Potash	Chlorotetracycline-25% Oxytetracycline-20% Ascorbic acid $CaCO_3$, $KMnO_4$	70%
	Catla	Exophthalmia (30%)	Bulging of one or both eyes	Oxytetracycline 1g/kg feed	Oxytetracycline-25%	60-70%

Histological observations

Histologically during the month of October, in both Rajbari and Biraldoho regions the investigated organs were almost normal except there some vacuums in skin-muscle and liver and hemorrhage and vacuums in kidney (Fig. 1A, 2G and 3A). Nasrin (2016) mentioned that skin and muscle had more or less normal structure in October in fish collected from different farms. According to Ahmed *et al.* (2009) in skin and muscle of *Monopterus cuchia*, epidermis and dermis were partly lost and some vacuums were seen dermis and mytotomes were arranged in normal fashion during October. Nasrin (2016), Marma *et al.* (2016) and Ahmed *et al.* (2012) also mentioned that kidney and liver had normal structure in the months of September and October in case of Thai koi and tilapia. However, in the both regions, the above mentioned investigated organs of fish had remarkable pathological changes like necrosis, hemorrhage, vacuum, pyknosis, hypertrophy and lamellar missing were observed in the month of December and January (Fig. 1B, 2B, 2K and 3E). Marma *et al.* (2016) observed that liver and kidney of *Channa punctatus* had marked necrosis, vacuum, inflammation and pyknosis with epidermis and dermis were partly lost having hemorrhage and necrosis during December and January. These observations are more or less are similar with the findings of Marma *et al.* (2007) and Ahmed *et al.* (2007). In the present study, it was observed that the investigated organs were almost normal in structure in March and totally recovered in May (Fig. 1F, 2F, 2L and 3F). Marma *et al.* (2016) also mentioned that severity of abrasions and pathology was gradually decreased during February and March. Similar results were reported by Hatai *et al.* (1994) and Ahmed *et al.* (2014b). Akter (2006) reported that in April and May organs were healed up in *C. punctatus, M. tengra and H. fossilis.*

During investigation it was observed that diseases like EUS, tail and fin rot, red spots and ulcers and exophthalmia were prevalent. With the use of aqua drugs the diseases had 60 to 85% recovery in various culture fish species. According to Majumder (2016) diseases if farm fishes of Kachua upazila had 60 to 75% recovery

when aqua drugs were used as treatment. On the other hand Monsur (2012) mentioned that edwarsiellosis in Thai pangus and white spot disease in Thai koi farmers achieved 80% recovery by using Timsen, Renamycine, Ossi-C and Polgard plus in Sherpur region.

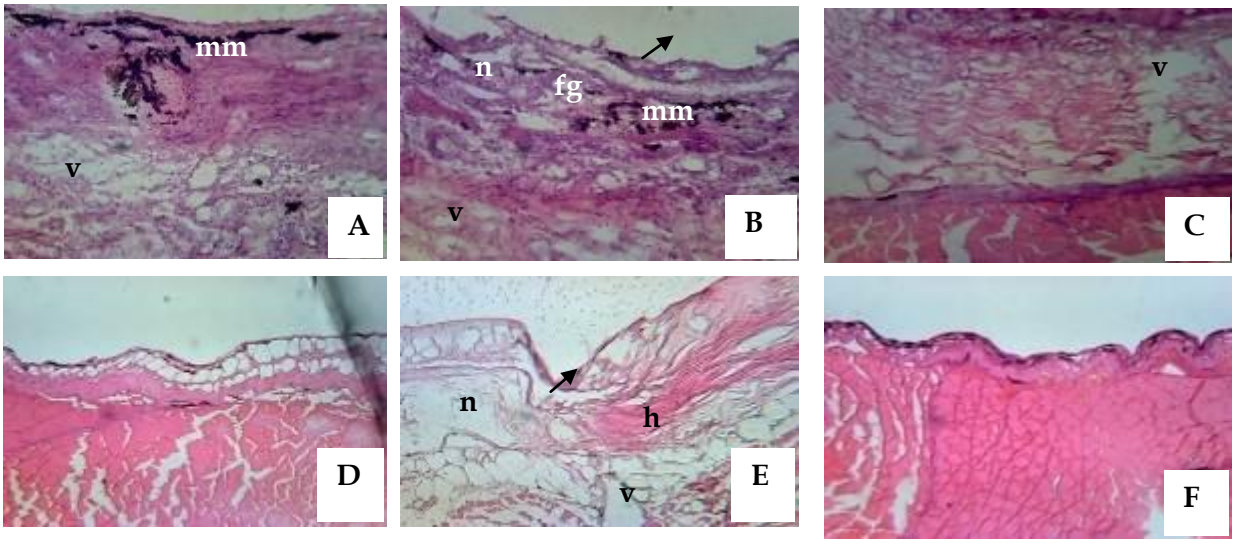

Fig. 1. Section of skin and muscle of *Gibelion catla*.
(A) in October from Biraldoho area showing vacuums (v) and melanomacrophage (mm). H & E. x 125. Cross-section of skin and muscle of *Gibelion catla*. H & E. x 125.
(B) with necrosis (n), fungal granuloma (fg), melanocytes (mm), vacuums (v) in muscle and dermis and epidermal missing (↗) in January from Biraldoho area. H & E. x 125.
(C) Photomicrograph of almost recovered skin-muscle of *Gibelion catla* 1 in March from Biraldoho area except some vacuums (v). H & E. x 125.
(D) Section of normal structure of skin-muscle of *Cirrhinus cirrhosus* 1 (D) in September from Rajbari area. H & E. x 125.
(E) Cross-section of skin-muscle of *Cirrhinus cirrhosus* in December from Rajbari area with hemorrhage (h), vacuums (v) and severe necrosis, epidermis partly lost (↗) and separated from dermis. H & E. x 125.
(F) Photomicrograph of almost normal skin-muscle of *Cirrhinus cirrhosus* 1 (F) in April. H & E. x 125.

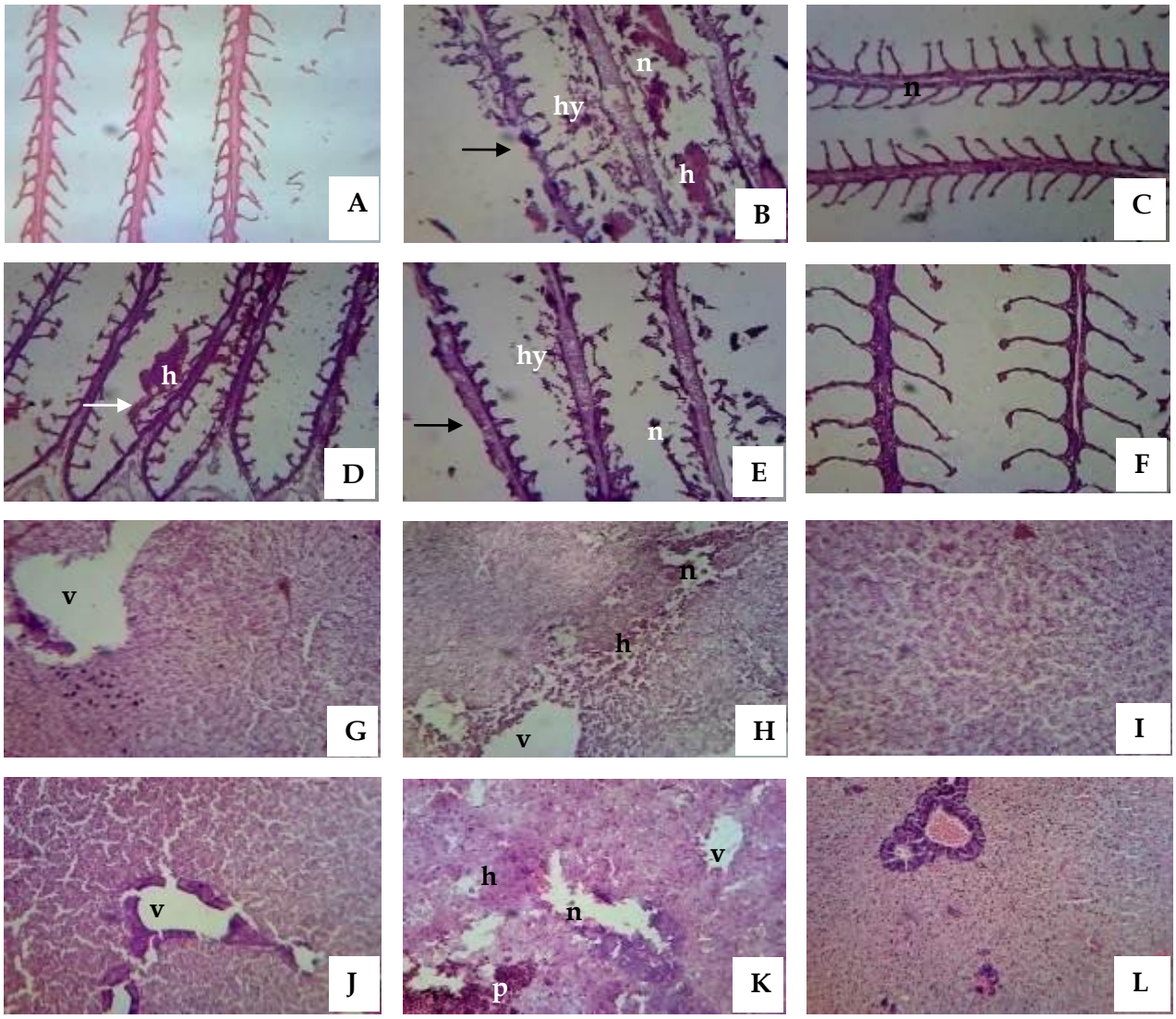

Fig. 2. (A). Section of almost normal gill of *Gibelion catla* in October from Rajbari area. H & E. x 125.
(B). Cross-section of gill of *Gibelion catla*) in January from Rajbari area with missing of secondary gil lamellae (↗), hemorrhage (h), hyperplasia (hy) and severe necrosis (n). H & E. x 125.
(C). Photomicrograph of totally recovered gill of *Gibelion catla* in May from Rajbari area. H & E. x 125.
(D). Section of gill of *Cirrhinus cirrhosus* with hemorrhage (h) and missing of secondary gill lamellae (↗) in October from Biraldoho area. H & E. x 125.
(E). Cross-section of gill of *Cirrhinus cirrhosus* in January from Biraldoho area with missing of secondary gill lamellae (↗), necrosis (n) and hypertrophy (h). H & E. x 125.
(F). Photomicrograph of almost recovered gill of *Cirrhinus cirrhosus* in March from Biraldoho area. H & E. x 125.
(G). Section of liver of *Gibelion catla* with only vacuums (v) in October fromBiraldoho area. H & E. x 125.
(H). Cross-section of liver of *Gibelion catla* in January from Biraldoho area with necrosis (n), vacuums (v) and hemorrhage (h). H & E. x 125.
(I). Photomicrograph of normal liver of *Gibelion catla* in May from Biraldoho area. H & E. x 125.
(J). Section of liver of *Cirrhinus cirrhosus* with vacuums (v) in October from Rajbari area. H & E. x125.
(K). Cross- section of liver of *Cirrhinus cirrhosus* in December from Rajbari area showing necrosis (n), vacuums (v), pyknosis (p) and hemorrhage (h). H & E. x 125.
(L). Photomicrograph of totally recovered liver of *Cirrhinus cirrhosus* 2 (L) in April from Rajbari area. H & E. x 125.

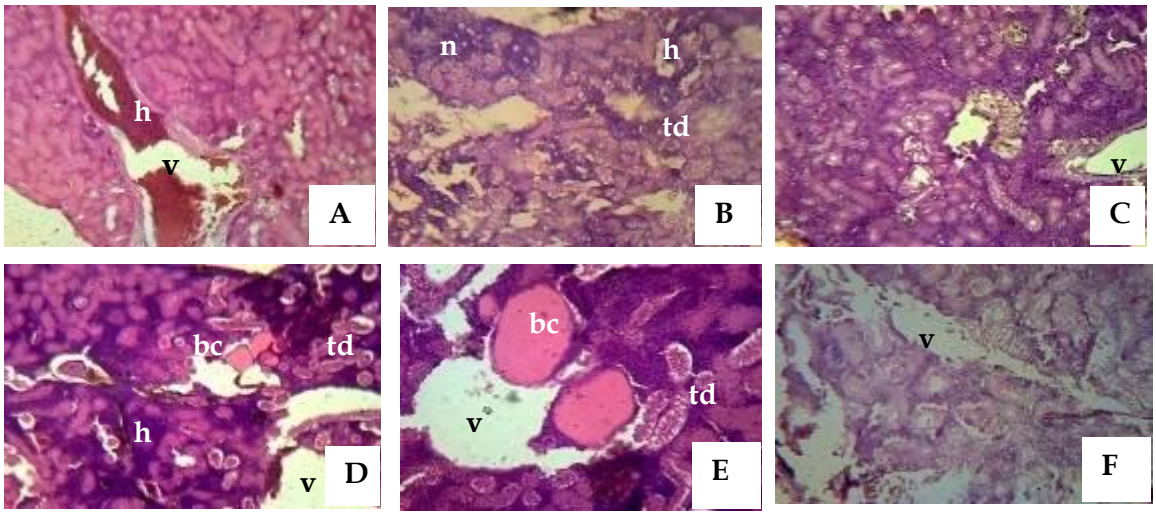

Fig. 3. (A). Section of kidney of *Gibelion catla* with vacuums (v) and hemorrhage (h) in October from Rajbari area. H & E. x 125.
(B). Cross-section of kidney of *Gibelion catla* in December from Rajbari area with vacuums (v), hemorrhage (h), necrosis (n) and tubular degeneration (td). H & E.x 125.
(C). Photomicrograph of almost normal kidney of *Gibelion catla* except some vacuums (v) in May from Rajbari area. H & E. x 125.
(D). Section of kidney of *Cirrhinus cirrhosus* with bacterial colony (bc), vacuums (v), hemorrhage (h) in November from Biraldoho area. H & E. x 125.
(E). Cross-section of kidney of *Cirrhinus cirrhosus* in January from Biraldoho area with large bacterial colonies (bc), vacuums (v), degeneration of renal tubules (td) and hemorrhage (h). H & E. x 125.
(F). Photomicrograph of almost recovered kidney of *Cirrhinus cirrhosus* except some of vacuums (v) in March from Biraldoho area. H & E. x 125.

CONCLUSION

From the present study, it could be stated that, aqua drugs had positive impact on aquaculture production except some pathological changes in the investigated organs of farm fishes especially during winter months. From the histological study, it was found that, external organs like skin, muscle and gills were more affected compared to internal organs like liver and kidney. Under pathological observations, fishes were mostly affected by epizootic ulcerative syndrome (EUS), red spots and ulcers on fins. Therefore, proper preventive measures would be taken in order to reduce the loss of production of farm fishes during winter season through prevention and control of diseases in fish. Use of aqua drugs and chemicals in ponds should be reduced in order to overcome adverse pathologies in fish organs. Farmers need to be more trained on the use of aqua drugs and chemicals during aquaculture practice. Appropriate applications, methods and dosage of aqua drugs should be maintained.

REFERENCES

Ahmed GU, Alam MN, Rahman MM (2015a) Impact of aqua-drugs and chemicals on the recoveries of fish diseases and total fish production in Sherpur region of Bangladesh. *Asian J. Med. Biol. Res.* 1(3), 600-606.

Ahmed GU, Dhar M, Khan MNA, Choi JS (2007) Investigation of disease of Thai climbing perch, *Anabas testudineus* (Bloch) from farming conditions in winter. *J. Life Sci.* 17(10), 1309-1314.

Ahmed GU, Faruk MAR, Shamsuddin M, Rahman MK (2014b) Impact of aqua-drugs and chemicals on fish health. In: MA Wahab, MA Shah, MS Hossain, MAR Barman and ME Haq (Editors). Advances of Fisheries Research in Bangladesh: 5th Fisheries Conference & Research Fair 2012. Bangladesh Agricultural Research Council, Dhaka, Bangladesh Fisheries Research Forum, Dhaka, Bangladesh. pp. 246.

Ahmed GU, Ferdous MJ, Hossain MS (2009) Disease Diseases occurrence and histopathology of catfish and snakehead in Ox-Bow lake Fisheries of Bangladesh. *J. Subtrop. Agricult. Res. Dev.* 7, 638-644.

Ahmed GU, Hasan MT, Faruk MAR (2014a) Study on impact of Aqua drugs and chemicals on fish health and production. *Bangladesh Agricult. Univ. Res. Prog.* 25, 95.

Ahmed GU, Hasan MT, Faruk MAR, Rahman MK, Hoque MN (2015b) Aqua drugs and chemicals: Impact on fish health and production in Mymensingh, Bangladesh. *Res. Agricult. Livestock Fish.* 2(1), 161-168.

Ahmed GU, Khatun T, Hossain MB, Samsuddin M (2012) Health condition of a farmed Tilapia (*Oreochromis niloticus*) in earthen ponds, Northern Bangladesh. *Bangladesh J. Fish.* 12, 287-293.

Akter N (2006) Study on health condition of freshwater eels from Ailee beel, Mymensingh, MS Thesis, Department of Aquaculture, Bangladesh Agricultural University, Mymensingh, Bangladesh.

DoF (2016) Department of Fisheries, National Fish Week 2016 Compendium (In Bengali). Ministry of Fisheries and Livestock, Bangladesh. pp. 131-132.

Faruk MAR, Alam MJ, Sarker MMR, Kabir MB (2004) Status of fish disease and health management practices in rural freshwater aquaculture of Bangladesh. *Pakistan J. Biol. Sci.* **7**(12), 2092-2098.

Hatai K, Nakamura K, Yuasa K, Wada S (1994) *Aphanomyces* infection in Dwarf Gaurami (*Colisa lalia*). *Fish Pathol.* 29, 95-99.

Majumder S (2016) Use of aqua drugs and chemicals in fish culture of Kachua upazila, Chandpur District, MS Thesis, Department of Aquaculture, Bangladesh Agricultural University, Mymensingh, Bangladesh. 51pp.

Marma K, Ahmed GU, Faruk MAR, Gosh K (2007) Clinical and pathological investigation of *Nandus nandus* collected from fish markets of Mymensingh. *Progress. Agric.* 18(2), 167-174.

Marma K, Ahmed GU, Paul SK (2016) Disease investigation of small indigenous fish species *Channa punctatus* of three fish markets in Mymensingh, Bangladesh. *Asian- Australasian J. Biosci. Biotechnol.* 1(2), 268-273.

Monsur A (2012) Use of Aqua drugs and chemicals in aquaculture of Jamalpur and Sherpur region. MS Thesis, Department of Aquaculture, Bangladesh Agricultural University, Mymensingh, Bangladesh. 45 pp.

Nasrin T (2016) Health status of farm fishes of Trishal Upazila, Mymensingh, MS Thesis, Department of Aquaculture, Bangladesh Agricultural University, Mymensingh, Bangladesh. 45 pp.

Rahman H (2012) Effects of aqua drugs on the health condition of farmed fishes of Jamalpur areas, MS Thesis, Department of Aquaculture, Bangladesh Agricultural University, Mymensingh, Bangladesh. 58pp.

Rahman MM (2011) Status and impact of commercial aqua drugs and chemicals on fish health at farmer's level, MS Thesis, Department of Aquaculture, Bangladesh Agricultural University, Mymensingh, Bangladesh.